بسم الله الرحمن الرحيم

قال تعالى :

(وَمَا أُوْتِيْتُم مِنَ العِلْمِ إِلَّا قَلِيْلاً)

سورة الإسراء-الآية(85)

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Eng. Waleed Babeker Badawi

Dedication

To…

My dearest Mother…

The Source of love and Care

To ….

My dearest father…

Is great soul

To …

My lovely Wife …

The Source of support, sincerity and faithfulness

To …

My son Mohammed the apple of my eyes

TO…

My Brothers and sisters …

The Source of encouragement

To…

All my teachers…

To …

All who helped and encouraged me to make this research in this form.

Thanks all

Abstract

The study was done to determine using crude oil as fuel for Al Fula thermal power station (3*135MW).

The evaluation is based on the environmental impact for crude oil as fuel for power stations and compare with two types of fuels.

The sample has been taken for crude oil fuel who to field treatments to be made and determine the properties.

After reconstruction and rehabilitation of the test rig, the following types of fuels (crude oil, HFO, HCGO) were tested through the combustion test and thus the analysis of combustion gases to determine the impact on pollution of the environment includes human, and the results are in the range permitted by the World Bank.

After combustion from different fuels it was:

1- There is no significant difference in pollutant emissions from the combustion of crude oil, HFO and HCGO fuel.
2- HFO more difficult to handle compared with crude oil due to its high viscosity.
3- During the tests found that more species HFO considerable need to heating before combustion and the temperature of the heater between (140 -150 ^{O}C), either crude oil requires to heating between (90 -100 ^{O}C), either HCGO requires to heating between (40 -50 ^{O}C).

ملخص البحث

أجريت هذه الدراسة لمعرفة استخدام خام البترول لتشغيل محطة كهرباء الفولة (3*135 ميقا واط) .

بُني التقييم والمقارنة علي التاثير البيئي لاستخدام خام البترول كوقود لإدارة محطات توليد الطاقة والمقارنة بين نوعين من الوقود.

إهتمت الدراسة بمراحل انتاج الخام ومراحل معالجته المختلفة وثم أخذت عينة منه وتحليلها في المعمل لتحديد الخواص المختلفة.

تم تعديل الجهاز الإختباري لاستخدامه لاحتراق الوقود , نفذت الاختبارات التجريبية لعدة أنواع من الوقود (الخام ,الفيرنس السوداني ,الفحم البترولي) عن طريق الاحتراق ومعرفة نواتجه وتحليلها واثرها علي البيئة وصحة الانسان وقد وجدت في مدى البنك الدولي لنواتج الاحتراق ومن المقارنة وجد أن:

1- ليس هنالك فارق كبير في كمية التلوث الناتج عن احتراق خام البترول والفيرنس والفحم البترولي.
2- مناولة الفيرنس أصعب من الخام للزوجته العالية .
3- من خلال الاختبارات وجد ان الفيرنس يحتاج الي تسخين قبل الاحتراق اكثر من الانواع الاخرى وقد تصل درجة الحرارة مابين (^{O}C 150- 140) ,اما الخام فيحتاج الي درجة حرارة مابين (^{O}C 100- 90) ,اما الفحم البترولي فيحتاج الي درجة حرارة مابين (^{O}C 50- 40).

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Abbreviations	*Definition*
FPF	Field Production Facilities of Fula Area B
CPF	Central Processing Facility of Fula Area B
ESD	Emergency Shut Down
HFO	Heavy Fuel Oil
HCGO	Heavy Coke Gas Oil, Heavy Cracked Gas Oil
GDP	Gross Domestic Product
GNP	Gross National Product
ASTM	American Society for Testing Material
IP	International Patrol
ISO	International Standard Organization
OGM	Oil Gathering Manifold
FWKO	Free Water Knock Out
HT	Heater Treater
CPI	Corrugated Plates Interceptor
MW	Mega Watt
LDO	Light Diesel Oil
BMCR	Maximum Continuous Rating
BECR	Boiler Efficiency Continuous Rate
TMCR	Turbine Maximum Continuous Rate
MCR	Maximum Continuous Rate
NEC	Sudan National Electrical Company
KNPS	Khartoum North Power Station
FD FAN	Forced Draft Fan
ID FAN	Induced Draft Fan
FGT	Flue Gas Temperature

C_xH_x	Hydrocarbon Compounds
PSV	Pressure Safety Valve
BOPD	Barrel of Oil Per Day
BWPD	Barrel of Water Per Day
BS&W	Basic Sediments &Water
kPa	Kilo Pascal

List of Units:

Parameter	***Unit***
Actual flow Rate	m^3/hr
Area	m^2
Density	kg/m^3
Heat	kW
Heat Rate	kW/m^2 °C
Heating Value (Liquid)	MJ/kg, kj/kg
Latent Heat	kJ/kg
Liquid Head	m
Liquid Volume Flow Rate	m^3/hr
Mass Flow Rate	kg/hr
Material Strength	MPa
Flow Rate	t/hr, m^3/hr
Capacity	Nm^3/t
Pressure Drop/Length	kPa/m
Specific Heat	kJ/kg°C
Temperature	°C
Velocity	m/s